

Converse and Contrapositive

Subjects to be Learned

- converse of proposition
- contrapositive of proposition

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For the proposition $P \rightarrow Q$, the proposition $Q \rightarrow P$ is called its **converse**, and the proposition $\neg Q \rightarrow \neg P$ is called its **contrapositive**.

For example for the proposition "If it rains, then I get wet",

Converse: If I get wet, then it rains.

Contrapositive: If I don't get wet, then it does not rain.

The converse of a proposition is not necessarily logically equivalent to it, that is they may or may not take the same truth value at the same time.

On the other hand, ***the contrapositive of a proposition is always logically equivalent to the proposition.*** That is, they take the same truth value regardless of the values of their constituent variables. Therefore, "If it rains, then I get wet." and "If I don't get wet, then it does not rain." are logically equivalent. If one is true then the other is also true, and vice versa.

Test Your Understanding of Converse and Contrapositive

Indicate which of the following converses and contrapositives are correct and which are not.

Click Yes or No , then Submit. There are two sets of questions.

1. If it snows, the schools will be closed.

Converse: If the schools are closed, it snows.

Contrapositive: If the schools are not closed, it does not snow.

☐ Yes ☐ No

2. If I work all night, I can finish this project.

Converse: If I can't finish this project, I work all night.

Contrapositive: If I can finish this project, I don't work all night.

☐ Yes ☐ No

3. I eat spicy food, only if it upsets my sytomach.

Converse: If I eat spicy food, it upsets my sytomach.

Contrapositive: If I don't eat spicy food, it doesn't upsets my sytomach.

☐ Yes ☐ No

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More Exercise

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